THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

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The Tuberculin Test

1. When the Ministry of Agriculture decided to undertake the preparation of tuberculin for use in connection with the Tuberculosis (Attested Herds) Scheme, the tuberculin prepared by the Bureau of Animal Industry, Washington, was selected as the type to be manufactured, following a study of the methods of manufacture of tuberculin employed in different countries, and in the light of the successful use of this tuberculin over a long period in a widespread eradication campaign.

2. Whereas the test in the United States of America was the single intradermal test in the caudal fold site, the officially recognised test in this country was the double intradermal test in the neck site. It was, therefore, necessary, before introducing the new tuberculin for official tests, to carry out an extensive series of field trials in order to make sure of its behaviour under the changed test conditions. These field trials indicated, as had been anticipated, that the new tuberculin produced more positive reactions than did the tuberculin formerly used. A considerable number of *post-mortem* examinations in cases where the new tuberculin gave a positive reaction and the old tuberculin a negative reaction proved the existence of infection with the bovine type of organism and established beyond doubt the superiority of the former for the essential purpose of revealing the bovine type of infection. As a result of these field trials it was decided to adopt Weybridge tuberculin for the pre-attestation official tests from January, 1940, and, when adequate supplies became available by May, 1940, to use this tuberculin for all official tests. While it was being used for pre-attestation tests, the percentage of positive reactors was found to be slightly higher than with the tuberculin previously in use, which was consistent with the results of the experimental tests.

3. When the Weybridge tuberculin came into use for retesting attested herds, in which the incidence of bovine tuberculosis was very low, the increase in the number of positive reactions as compared with previous experience was much greater, the percentage of herds showing reactors being doubled, and the percentage of reacting cattle being quadrupled. *Post-mortem* examination of reacting animals from those herds failed in a high proportion of cases to show infection with the bovine tubercle bacillus, and it became evident that the sensitivity of these animals to tuberculin was due to some other cause, such as infection with some other type of acid-fast organism, particularly the avian tubercle bacillus. It seemed probable that the prevalence of such infections in the herds in this country was higher than had been realised. At the same time it was clearly essential that the test employed should be capable of protecting the owner of an attested herd against the risk that would be involved in failing to detect an infection due to the bovine bacillus.

4. Faced with this problem, the Ministry asked the Agricultural Research Council to investigate the whole question of the tuberculin test with special emphasis on the question of dosage, since it was then felt that the excessive number of non-specific reactions might be due to an unnecessarily large dose of the tuberculin. At the same time it was essential to find some immediate, even if only temporary, means of meeting the situation. The Ministry, therefore, adopted the only practicable means available by introducing a comparative test, with all its attendant difficulties, using mammalian and avian tuberculins as had been done in other countries. This test consists of the simultaneous injection of the two tuberculins, when a comparison of the resulting reactions makes it possible to distinguish between those reactions due to infection with the bovine bacillus and those due to other infections. The question of the interpretation of the comparative test is dealt with in later paragraphs.

5. The gist of certain preliminary findings recently furnished by the Agricultural Research Council to the Ministry is as follows:—

(*a*) That much more information is required before the tuberculin test can be placed on a *fully* satisfactory basis;

(*b*) That tests carried out with a sample of the tuberculin formerly in use and of Weybridge tuberculin, confirmed the Ministry's findings that the former was unsatisfactory as a diagnostic agent for bovine tuberculosis;

(*c*) That Weybridge tuberculin has been used in too high a dose for the double intradermal test as employed in this country and for this reason has given an excessive number of positive reactions in cattle showing no evidence of infection with bovine tuberculosis;

(*d*) That, as a result of comparisons which have been made with Weybridge tuberculin and a purified tuberculin (P.P.D.), the evidence at present available suggests that a greatly reduced dose of Weybridge tuberculin or an equivalent dose of P.P.D. would give positive reactions with the great majority of cattle infected with bovine tuberculosis and would reduce the number of false positives given by Weybridge tuberculin at the existing dose. No dose, however, will detect all cattle infected with the bovine type of organism and at the same time give no false positive reactions;

(*e*) That a change to P.P.D. as soon as possible is considered desirable on the general ground that a purified or partially purified product containing "the active principle" is to be preferred to a product of less certain composition.

6. As a result of this report, P.P.D. tuberculin at the recommended dose will be introduced at an early date—as soon as supplies are available. Recent preliminary tests carried out in attested herds with the smaller dose of Weybridge tuberculin, or with P.P.D., suggest that the number of non-specific reactions, though reduced, will probably remain so high as to necessitate the continued use of the comparative test on a wide scale.

7. In the meantime, as indicated in the preliminary report of the Agricultural Research Council, much work remains to be done in connection with the tuberculin test. Among the problems that are being actively investigated in conjunction with the Ministry are optimum dosage, site of injection, double or single intradermal test, optimum times of reading, and the comparative test.

8. Paragraph 4 indicated the circumstances in which the comparative test was introduced and the need for it. It has been strongly criticised mainly on the grounds that it is unscientific and that the interpretation of the results is not in the hands of the individual conducting the test, but is made by Headquarter officers who have only paper evidence before them. The comparative test and the reasons why it has been found impracticable to leave the interpretation of this test to the Inspector in the field are discussed in the following paragraphs.

9. The main difficulty that arose in connection with the introduction of the comparative test as an emergency measure was that of finding a reliable basis of interpreting the variation in the reactions to the two tuberculins, since the relative potency of the tuberculins used for the comparative test in other countries, *e.g.*, by Plum in Denmark, and on a limited scale in this country was unknown. In the circumstances the standard of interpretation adopted at the outset was necessarily somewhat arbitrary and a basis had to be established in the light of experience. The standards initially adopted have been proved reasonably accurate and have been slightly modified from time to time in the light of subsequent tests and *post-mortem* examinations. *Post-mortem* examinations have shown that errors of interpretation were occasionally made, but consequent adjustments to the basis of interpretation have now reduced errors to negligible proportions.

10. On the introduction of the comparative test it was found necessary that the final interpretation of the Veterinary Inspector's report should be made at Headquarters for the following reasons.

(*a*) In the circumstances in which the comparative test was introduced, there would be no pre-determined basis of interpretation.

(*b*) In estimating the significance of a comparative test in any individual animal, and particularly in deciding on the action to be taken as the result of such tests, the past test history of the herd and the results of current tests in other animals in the herd must be given careful consideration. In view of the scale on which comparative testing is necessary, it would be not only inconvenient but impracticable to supply Inspectors with all the earlier test records.

(*c*) Having regard to the absence of any definite basis of interpretation, a more accurate and uniform standard of judgment may be expected where the work is performed by a small staff under direct control at Headquarters than if entrusted to a large number of individuals in the field some of whom have only a few herds to test,

(*d*) Modifications have necessarily had to be made from time to time, particularly in the earlier stages of its application, in the interpretation of the comparative test. Even now the position cannot be said to be stabilised, particularly since, as indi-

cated earlier, certain changes in the tuberculin are being introduced. This reason, together with the need to consider test histories, renders inadvisable any change from the existing practice of issuing the final interpretation from Headquarters.

It should, however, be noted in this connection that Instructions to Inspectors have always required the inspector in the field to record his opinion as to whether a reaction is positive, negative or doubtful, and he is still required, whether applying a comparative test or a test with mammalian tuberculin only, to record his opinion of all reactions. The final decision on test results has always been made at Headquarters; when mammalian tuberculin only was used, the decision rarely differed from that of the inspector in the field with the result that owners frequently acted on the opinion of the inspector before receiving any intimation from Headquarters. The interpretation of the comparative test, however, is not a straightforward decision on one reaction, but is based on the inspector's recorded results of the reactions to the two tuberculins and its object is to decide the exact significance of the reactions in any particular animal.

11. The following factors, some of which are not peculiar to the comparative test, affect in varying degrees the interpretation of the test and the decision as to what action should be taken.

(*a*) Knowledge of the existence in the herd of bovine tuberculosis or non-specific infections or both.

It should be noted in this connection that the first comparative test of reacting or doubtful animals in any herd provides also for the comparative test of a certain number of non-reactors; the discovery in such cases of a mammalian-negative, avian-positive animal establishes the presence of a non-specific infection in the herd and provides a guide to the interpretation in the case of animals positive to both tuberculins.

(*b*) In some animals, the reaction to avian tuberculin does not reach its maximum within the normal period of observation and many of these delayed reactions are negative at the normally final observation at the 72nd hour or even later, notwithstanding that the maximum reaction to mammalian tuberculin appears at the normal time. These delayed reactions are mostly found in animals tested with avian tuberculin for the first time.

(*c*) The site of the injection of the tuberculin has a much greater influence on the degree of the reactions than was formerly realised. Injections close to the shoulder give markedly poorer reactions than in sites nearer the head, so that unless the tuberculins are injected in equally favourable sites, the variation in the reactions due to site may be such as to invalidate the normal basis of interpretation.

(*d*) Some animals with lesions of so-called skin tuberculosis give a marked reaction to mammalian tuberculin but little or no response to avian.

(*e*) The co-existence in a herd of a non-specific infection and infection with bovine tubercle bacilli producing a low sensitivity to tuberculin. An animal recently infected with avian tuberculosis may be highly allergic and give such reactions as to mask the lesser reactions due to infection by a bovine type of organism which has produced a low degree of allergy.

12. In spite of the desirability of retaining the final interpretation of official comparative tests at Headquarters the stage has now been reached when it is possible, subject to the limitation imposed by the absence of herd histories, to provide practitioners wishing to use Weybridge tuberculin for private tests with a guide for the interpretation of the comparative test. The basis of interpretation to be provided must, however, in the circumstances, be well on the side of safety from the point of view of ensuring that animals with bovine infection are not classed as non-reactors.

Ministry of Agriculture and Fisheries.

April, 1942.

The Comparative Test with Weybridge Tuberculin

The following notes on the comparative test with mammalian and avian tuberculins and the system of interpretation adopted by the Ministry are supplied for the guidance of veterinary practitioners who may wish to carry out this test with Weybridge tuberculins in their private practices as well as for the information of all concerned in the application of the test.

1. For the purposes of the comparative test the double intradermal method is employed with the following exceptions :—

(*a*) In retesting positive and doubtful reactors to a double intradermal test in which mammalian tuberculin only was used ; in such cases a number of known negative animals of the same age group or groups should be included in the test as controls, and

(*b*) In retesting animals which have given inconclusive results with a double intradermal comparative test.

In these cases it is the practice to employ the single intradermal method, which, whilst enabling a comparison to be made of the sensitivity to the two tuberculins, can be regarded as complementary to the preceding double intradermal test required for official and other purposes.

The term "doubtful" is used to describe the reaction to an injection of a tuberculin which is neither positive nor negative; "inconclusive" is used to describe the result of a comparative test where the reactions, history, etc., have not enabled a definite opinion to be formed as to the type of infection causing the reactions.

2. The site of the injection of the tuberculin is of great importance, particularly in the comparative test. Injections close to the shoulder give markedly poorer reactions than in sites nearer the head, so that unless the tuberculins are injected in equally favourable sites, the variation in the reactions due to site may be such as to invalidate the normal basis of interpretation. If the injections are made on the same side of the neck, they must be made equidistant from the point of the shoulder and in the middle third of the neck.

3. When Weybridge tuberculin is used, any swelling showing diffusion, irrespective of increase in skin measurement, should be regarded as a positive reaction. When the swelling shows no diffusion, the reaction to the double intradermal test should be regarded as negative when the increase in measurement is 3 mm. or less, as doubtful with an increase of 4 mm. and as positive with an increase of 5 mm. or more. For the single intradermal test these increases should read 2, 3 and 4 mm. respectively. Few bovine infected animals give positive reactions showing increases of 5 mm. or less and most reactions of this degree are probably due to non-specific infection, but the bovine infected animal of low allergy must be guarded against as far as possible.

4. An animal giving a negative reaction to mammalian tuberculin and a positive reaction to avian must be regarded as infected with a non-specific infection. Such a reaction can be accepted as evidence of the existence of a non-specific infection in the herd, evidence which has a definite bearing on the interpretation of other reactions. It is, however, not infrequently found that such evidence of non-specific infection may be confined to one particular age-group, usually, but by no means always, the young stock, with the result that in such cases a different standard of interpretation is applicable to the other age groups.

5. If the presence of non-specific infection within an age group has been established,

(*a*) Animals which show positive or doubtful reactions to both tuberculins and in which the mammalian reaction is not greater than the avian by more than 4 mm. should be regarded as infected with non-specific infection ;

(*b*) Where the excess to mammalian tuberculin is between 4 and 6 mm. the result should be regarded as inconclusive and the animal should be retested ;

(*c*) Where the excess in the reaction to mammalian tuberculin is more than 6 mm. the animal should normally be regarded as infected with bovine tuberculosis.

6. When definite evidence of non-specific infection in the herd and age group is lacking, animals showing a positive or doubtful reaction to both tuberculins should be retested when the reaction to mammalian tuberculin does not exceed the avian by more than 4 mm. ; other reactors to both tuberculins must be regarded as infected with bovine tuberculosis.

7. Animals showing positive mammalian, negative avian reactions are normally regarded as being infected with bovine tuberculosis, but in herds with well established non-specific infection it is usually wise to retest such animals in view of the not infrequently delayed reaction to avian tuberculin. Observations up to the 120th hour may avoid the necessity for such retests.

8. Animals showing doubtful mammalian, negative avian reactions should always be retested. Here again, later observations may avoid the need for retesting.

9. Retests should be carried out not less than one month after the preceding test and in assessing the results of retests of inconclusive reactors regard should be had to the responses at the two tests ; non-specific reactors usually show a lessened response to mammalian tuberculin and not infrequently—though less consistently—an increased avian reaction.

10. This system of interpretation is intended for application to tests of herds. It can also be applied to groups of cattle which have come from one source. Tests of single animals and collections of animals from different sources must be interpreted on the basis that no evidence of non-specific infection exists, as in paragraph 6 above.

Seeing that the criteria applicable in the case of a herd test cannot be applied in interpreting the comparative test of single animals, such animals being tested for entry to sales should be tested sufficiently early to allow a retest to be carried out, should such prove necessary, before the date of the sale or the closing of entries as the case requires. In retesting such animals it may facilitate interpretation to test at the same time a few animals in the same age group as controls, if this is practicable.

Ministry of Agriculture and Fisheries. *April*, 1942.

THE VETERINARY RECORD

May 16th, 1942

TUBERCULIN TESTING

THE two official papers relating to the above test appearing in this issue represent the first response of The Animal Health Division to the Association's recent request that the profession be kept fully informed of the position regarding the use of this important means of diagnosis. While it is not possible at the moment to set out the findings on which certain of the announced decisions are based, the transmission of the information contained in these two documents meets the Association's wishes in a most generous fashion.

The vital importance of tuberculin testing demands their careful study and all that is necessary here is to emphasise the salient points and to initiate a discussion of the existing position. The outstanding statements are those which contend that the tuberculin in common use prior to May, 1940, was unsatisfactory, that Weybridge tuberculin has been used at too high a dose for the double intradermal test and that much work is still to be done to define the dose of tuberculin and the test most suitable for use in this country.

It is regrettable that much of the past experience of tuberculin testing does not assist the solution of current problems because we are only now fully aware that "dose" plays a vitally important part in determining response and because we cannot relate the dose used in the past with that now employed. We had hoped to see set up a standard for veterinary tuberculin—a standard to which the immediate past, the current and the future dose could be related. Although the opportunity to define an International Standard does not exist at the moment, there seems no reason why British Standard Veterinary Tuberculins—one mammalian and one avian—cannot be established now and the doses used in field and experimental work related to them.

Much controversy has centred round the basis of interpretation. The Ministry has presented a clear statement of the criterion on which the reaction to the current Weybridge tuberculin is to be judged. It differs in one material respect from accepted standards of the past—swellings to the double intradermal test which show no diffusion are doubtful if the increase in skin measurement is 4 mm. and positive where an increase of 5 mm. or more is recorded. This decision must have been based upon a review of an immense number of test results. Because the standard differs from that of the past is no good reason to suspect its validity. Past standards were based on experience with entirely different types of tuberculin and different doses of the active principle. The swelling at the site of a positive reaction is inflammatory in nature; it may well be a matter of chance whether the cells and fluid which collect at the site cause a firm or a soft swelling. With modern tuberculin the reaction swelling at the neck site, as in the caudal fold, varies in character. There seems to be no logical reason to deny the non-diffuse positive reaction; its occurrence has been demonstrated and must be accepted.

Research in tuberculin production has led to the preparation of more pure products and the assurance that a change to P.P.D. (Purified Protein Derivative) tuberculin is contemplated will be welcomed. These purified products may be more costly to prepare but the profession and the agricultural community are entitled to demand the provision of the most satisfactory product for this important work.

In this country the major difficulty of the moment is the determination of the type of sensitivity which has caused reaction. It is generally accepted that specificity in tuberculin is far from absolute. The level of reaction depends very largely on the degree of sensitivity of the animal and on the dose of tuberculin, be it mammalian or avian, which is injected. The avian infected animal of high sensitivity will react to a low dose of mammalian tuberculin, that of low sensitivity to a large dose. When the existence of non-specific sensitivity was less appreciated its existence was often ignored. "Once a reactor, always a reactor" was an accepted dictum—accepted in ignorance. The use of Weybridge tuberculin at too high a dose has led to a better understanding of our problem. We look forward to the publication of that phase of the current work which will define the dose of tuberculin which gives a positive reaction in the great majority of cattle affected with bovine tuberculosis and reduces to reasonable proportions the incidence of response in animals infected with other acid-fast organisms. It can then be decided at what doses mammalian and avian tuberculins can best be used to differentiate reactors into those two categories which must, it seems, always exist—those sensitised by bovine infection and those sensitised by infection with another acid-fast organism. The comparative test as at present applied cannot be regarded as other than a "stop gap." Until it is placed on a firmer footing the majority of the profession will be content to leave decisions in the hands of Headquarters officers. The explanation of the basis of its interpretation will, however, allow the field officer to take a more intelligent interest in its application. It would appear, however, that the practitioner faced with deciding the fate of an animal whose herd history is unknown and which has reacted to Weybridge tuberculin can expect little help from the existing comparative test.

These current publications cannot do other than reawaken interest in tuberculin testing. They emphasise the need for skill and care in this work and assist the practitioner who uses Weybridge tuberculin for private tests. Careful siteing of the tests is necessary, accuracy in injecting the dose is essential and careful measurement of prime importance. On the last point one may be permitted the criticism that in cases where differences of one or two millimetres increase in skin thickness may decide the fate of an animal—perhaps the fate of the herd—there is an urgent need for the development of more accurate measuring instruments. It seems obvious that the practitioner who upholds the honour of the profession is he who treats his testing as a skilled operation meriting his painstaking care of detail.

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CATTLE DISEASES CONTROL SCHEME

FOR nearly two years the Association has been devoting considerable attention to the losses arising from disease among farm livestock and particularly to the development of a scheme for the control of certain of these diseases in dairy cattle. The main terms of the scheme were agreed with representatives of the Animal Health Division of the Ministry of Agriculture and of the National Farmers' Union many months ago, and details were published in the Supplement to the issue of *The Veterinary Record* of August 30th, 1941.

The scheme has been considered by most of the Divisions of the National Veterinary Medical Association, but even after their general assent its actual introduction has been delayed pending completion of the arrangements for making available the necessary Government facilities and its consideration by the branches of the National Farmers' Union. We understand that these branches have, generally speaking, expressed their willingness to co-operate in the scheme.

The arrangements for facilities to be granted by the Ministry of Health are now complete, an official form of undertaking is available and the date for the launching of the scheme has been fixed as June 1st.

The Minister of Health has recently made an Order enabling the use in tuberculin tested herds of either of the two official vaccines to be issued by the Ministry of Agriculture for use under the scheme.

Weekly Wisdom

The assertion of narrowly conceived national interests against a wider common good leads only to a common misery. This is the true international revolution which has made a return to the Europe of the past unthinkable.—The Times.

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The manufacture of national cattle-foods Nos. 1 and 2 is now prohibited. No. 1A will be the only type of complete dairy compound available during the summer.

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Foot-and-mouth disease was confirmed on Friday of last week among cattle at Colintraive, Argyllshire.

Use of Live Abortus Vaccines in T.T. Herds

In view of the developments in relation to the use of live abortus vaccines which have taken place since the Milk (Special Designations) Order, 1936, was made, and after consultation with the Medical Research Council, the Minister of Health has made Regulations modifying the present prohibition of the use of such vaccines in T.T. herds.

The Regulations, which come into operation on June 1st, 1942, provide that no animal in a T.T. herd shall be vaccinated with live *Brucella abortus* except with the approval of the Minister of Agriculture and Fisheries and with a vaccine approved by him. Such approval will only be given in the case of T.T. herds which are infected with contagious abortion, and will be subject to the use of either of two approved vaccines obtainable by veterinary surgeons only from the Ministry's Veterinary Laboratory, New Haw, Weybridge, Surrey.

Any owner of a T.T. herd in England and Wales who wishes to arrange with his veterinary surgeon for the vaccination of any animals in the herd with a live abortus vaccine, should apply to the Divisional Veterinary Inspector of the Ministry of Agriculture and Fisheries, either directly or through his veterinary surgeon, for the necessary approval. The application should be accompanied by a laboratory report of the blood agglutination test, or of the examination of material providing evidence that the herd is infected.

The Control of Certain Diseases of Dairy Cows

The following is the detail of the scheme for the control of certain diseases of dairy stock which had been circulated to the branches of the National Farmers' Union for use at their private meetings.

The group of diseases comprising mastitis, contagious abortion, sterility and Johne's disease, is the cause of losses to the dairy farmers of this country amounting to many millions of pounds annually and of the loss to the nation's milk supply of at least 50,000,000 gallons, apart from a reduction in the meat supply, as a result of abortion, sterility, etc. Such losses, largely preventable, are intolerable at a time which calls for the maximum production of food, and the National Farmers' Union of England and Wales, the National Veterinary Medical Association and the Ministry of Agriculture and Fisheries have accordingly prepared a scheme designed to encourage and facilitate the better control of these diseases.

As a result of research in recent years, effective methods of control of these diseases are now available, and the methods advocated in the scheme in question have also been approved by the Agricultural Research Council as the most suitable for application in the field in the light of present-day knowledge. The essence of the scheme consists of an undertaking between the farmer and his veterinary surgeon in which each will play his part in carrying out the approved methods of control. In every case where such an undertaking is entered into the Ministry of Agriculture will provide free laboratory services for such diagnostic work as may be necessary, abortion vaccine free of cost, and sulphanilamide at a greatly reduced charge. In this way farmers will be enabled to obtain a comprehensive service for the control of the diseases in question considerably cheaper than they otherwise would be able to do.

The National Veterinary Medical Association, for their part, have agreed to a scale of fees which should be well within the reach of the average farmer and which should prove a profitable investment to any farmer who suffers appreciable losses from the ravages of one or more of those diseases. The annual payments which the farmer will have to make under the scheme are as follows:—

Cows.—For each cow up to and including 10 ... ... 12s. 6d.
For each cow over 10 in herds up to and including 50 cows ... ... 10s. 0d.
For each cow in herds of over 50 cows ... 10s. 0d.
Heifers.—For each heifer from the age of six months to the day of first calving ... ... 2s. 6d.

The fees set out in the above scale will be subject to an abatement of 10 per cent. in the second year and of 20 per cent. in the third year of the period covered by an undertaking.

A charge of 2s. 6d. will be made in the case of any animal treated with sulphanilamide.

A veterinary surgeon may also charge travelling expenses at the rate of 4d. per mile for any mileage in excess of 10 miles each way.

Each undertaking will be for a minimum period of one year, but it is recommended that the period should be two or three years in order to encourage that continuity of effort which is essential if the best results are to be secured.

It cannot be too strongly emphasised that the approved methods of control call for a high degree of co-operation on the part of the farmer; without his wholehearted assistance the most zealous and efficient services of the veterinary practitioner will be largely nullified. The additional precautions, which the farmer must adopt to ensure the success of the control methods, can properly be regarded as an essential part of successful herd management and will amply repay the trouble involved.

In succeeding paragraphs a brief description is given of the diseases in question and of the approved methods of control with an indication of the obligations of each party to an undertaking. The objective of this scheme is not the eradication of these diseases, which is a long term policy, but short term control to meet the need for a maximum milk supply. Since tuberculosis is not capable of control by treatment and is already provided for by Government Acts and Orders, this disease does not come within the scope of the Scheme.

Mastitis

Between 80 and 90 per cent. of mastitis in dairy cows is caused by an organism called the *Streptococcus agalactiae.* The mastitis it produces is usually of a sub-acute or chronic character, though occasionally an acute attack is caused. Mastitis causes greater loss in milk to the dairy industry than any other disease.

While the symptoms of an acute mastitis are well known to all farmers (swelling, heat and pain in the affected quarter or quarters with marked changes in the character of the milk), the early stages of the more common types are not so easy to recognise. Many animals harbour the organism in the udder without showing any clinical evidence and some time may elapse after infection before flecks or tiny clots may be found in the milk, especially in the foremilk. It may be a long time, frequently extending over more than one lactation, before the damage done in the udder becomes obvious; then the damage is irreparable and even if the process be arrested by suitable treatment, milk secretion is reduced in proportion to the damage done.

Spread of Infection.—Infection is spread from cow to cow by milkers' hands, milking machines, bedding or floors which have been soiled with infected milk, flies, etc. There is little evidence that infection enters the udder by other means than through the teat canal or sores or wounds on the teats or udder; though it has been suggested that a heifer may still be infected at calving through having been fed on infected milk as a calf.

Predisposing Factors.—The principal predisposing factors are:—

1. Overstocking, through straining the udder tissue;
2. Hurrying the cows, especially before milking, thereby causing damage to the udder, particularly in older cows with large pendulous udders;
3. Incompetent milking with rough inexpert handling and inefficient stripping;
4. Ill-managed milking machines: the vacuum pressure may not be properly adjusted; the teat cups may be left on too long, allowing harmful suction to be exerted on the empty udder.

Control.—The frequent bacteriological examination of milk from each quarter of the udder of all cows with complete isolation of infected animals, which is necessary for the complete control of the disease, is impracticable as a general measure. The early recognition of infected cows can best be effected by the daily examination by the farmer of the foremilk by the use of the strip cup, supplemented by clinical veterinary examination at regular intervals. The appearance of clots or flecks in the milk should be accepted as evidence of infection. Infected cows should be segregated, in a separate shed if practicable, and should be milked after the non-infected. The greatest care is necessary in preventing spread of infection through milkers' hands, milking machines and udder cloths. Milkers' hands should be scrubbed clean before milking and rinsed in a disinfectant, preferably a chlorine disinfectant, after the milking of each animal. Milking machines must similarly be kept thoroughly clean and the cups dipped in chlorine disinfectant after each cow is milked. Udder cloths must be disinfected after each udder is washed: it is best to use the cloths in pairs, using them alternately. Milking should be gently and expeditiously done with careful attention to stripping.

Treatment.—For chronic cases the most beneficial treatment is the injection of the udder with solutions of acridine dyes. This is best done when the cow is dry or just going dry. In acute cases, good results are rapidly obtained from the administration of sulphanilamide. Cows which have been treated in this way should be milked after the clean cows and before the other infected ones.

Other Types of Mastitis

Occasionally acute cases may arise from infection with other organisms. These cases show marked swelling, heat and pain in the affected quarters and a drop in the milk yield. After suitable treatment some of these cases recover, but in others a quarter

may be lost or a cow may die from the action of the poisons produced by the organisms.

Another type is known as "Summer mastitis," occurring in hot weather and usually affecting dry cows and heifers. A foul-smelling greenish-yellow or blood-stained pus is produced in the infected quarter, abscess formation is not uncommon and there may be swelling of one or more joints. The incidence of this type varies considerably and there is some evidence that flies may spread the infection from cow to cow. Filling the teats with an antiseptic emulsion before turning out dry cows or heifers is a useful preventive.

Tuberculous mastitis is usually slowly progressive, in which form it is first recognisable as an induration or hardening of one or more quarters with no heat or pain and no change in the appearance of the milk. Farmers are required by the Tuberculosis Order to notify any cow which is or appears to be affected with tuberculosis of the udder, indurated udder or other chronic disease of the udder. Under the provisions of the Order, cows affected with tuberculosis of the udder are slaughtered and compensation paid.

What the Farmer should do

1. Examine the milk of each cow daily by the strip cup.
2. Segregate so far as practicable infected animals.
3. Milk non-infected animals first.
4. Ensure thorough cleansing and disinfection of milkers' hands and milking machines before and during milking.
5. Milk and strip carefully.
6. Immediately report the occurrence of any acute cases to the veterinary surgeon.
7. Regularly inspect dry cows and heifers for the early recognition of "Summer mastitis."

What the Veterinary Surgeon should do

1. Examine all cows at quarterly intervals and pay such other visits as may be necessary for the control and treatment of the disease.
2. Enlist where necessary the services of the appropriate laboratory to determine the type of infection.
3. At the end of the lactation period or when otherwise necessary, treat each cow affected with chronic mastitis by irrigation of the udder with an acridine dye.
4. Supply sulphanilamide for the treatment of suitable cases.
5. Supervise generally the preventive measures taken by the farmer.

Contagious Abortion

The most common cause is the *Brucella abortus;* two other causes of abortion are dealt with later in considering sterility. This infection is spread by the uterine discharges of an infected animal. Not every infected animal aborts, though every infected animal spreads infection at the time of calving. An animal which has aborted is much less likely to abort during the next pregnancy.

Measures of Control.—There are two methods of dealing with this disease: eradication by blood testing of the herd and the segregation and disposal of animals which are shown by the test to be infected, or control by vaccination which will enable the animal to resist infection or, if she becomes infected, to carry her calf to full term.

Blood Testing and Segregation of Reactors.—This method can only be recommended in herds which are lightly infected and where the system of herd management—self-contained herds, etc.—will give reasonable hope of success. In view of the repeated blood tests which are necessary and the great risk of reintroducing the disease, this method is only suitable in a small minority of cases.

Vaccination.—No curative agent has been found to be effective and dead vaccines have failed to give satisfactory results, but suitable live vaccines confer an immunity or resistance similar to that provided by natural infection and, coupled with hygienic measures, will give the best results in the large majority of herds.

The Ministry will issue two vaccines for the control of contagious abortion in herds infected with that disease. No. 1 (Standard) vaccine is the strain described in the U.S.A. as Strain 19; No. 2 vaccine is the Wye 45 (20).

The available evidence suggests that both these vaccines will be effective when used in adult animals. The No. 1 vaccine, which will be used as the standard vaccine, is administered in a single dose and has been widely and successfully used for the vaccination of calves. The No. 2 vaccine, which will be used in those cases where for any reason a particular preference for it is expressed, has so far been successfully tested in adult animals, using two doses. Since it is not yet known whether it will be equally effective in a single dose, two doses should be employed. Whether this vaccine is suitable for calfhood vaccination is not yet known, and until this knowledge has been acquired it should not be used for this purpose. For those herds, however, which depend on the sale of animals giving a negative agglutination test, this vaccine possesses the advantage that it does not produce positive reactors.

The use of any live vaccine other than one of the two supplied by the Ministry will not be permissible under the scheme.

What the Farmer should do.—While detailed measures of control can only be determined by the veterinary surgeon dealing with the herd—as these will vary in accordance with the history of the disease, the degree of infection, facilities for segregation and so forth—the following precautions are generally applicable:—

1. Report the fact that an animal has aborted to the veterinary surgeon.
2. Since uterine discharges are the main source of infection, arrange to calve separately from other stock and only allow infected animals to rejoin the herd when all discharges have ceased.
3. Destroy the aborted calf and foetal membranes and disinfect any part of the premises contaminated with the discharges.
4. Prevent contamination of feeding-stuffs, bedding, etc., by attendants' boots, etc.
5. Ensure, so far as possible, that cows or heifers which have aborted are fed and attended to *after* the healthy ones.

What the Veterinary Surgeon should do

1. Collect blood samples, where necessary, to establish the presence of brucella infection.
2. Vaccinate all animals requiring to be vaccinated.
3. Advise as to the special precautions necessary in the particular herd.
4. In herds where eradication is being carried out, collect the necessary blood samples and advise as to the isolation of reactors.

Sterility

Temporary infertility—or as the farmer more commonly calls it, sterility—is a common cause of serious loss in dairy herds. Farmers should aim at having their cows produce a calf once a year and so avoid waste in maintaining unproductive cows over a long period. Many causes of temporary infertility can be removed by veterinary treatment. Early treatment gives by far the best results.

Causes

Infections.—The vast majority of cases of temporary infertility are due to inflammatory changes in the genital tract. Such changes are common in cows infected with contagious abortion, but since all infected animals do not abort, infertility is not restricted to animals which have aborted.

There are two other specific infections causing sterility which are becoming increasingly prevalent in this country. Both these infections are transmitted by the bull. In the one case, due to the organism *Trichomonas,* abortion usually occurs between the eighth and twelfth weeks, and at this early stage may not be observed. After some such early abortions the cow does not come in season and, in the absence of diagnosis, may be believed to be in calf; a periodic vaginal discharge may, however, be observed. In the other infection, due to the organism *Corynebacterium pyogenes,* abortion usually takes place between the twelfth and twenty-fourth weeks and, though an infected cow may carry her calf to full term, a very persistent vaginal discharge—"whites"—develops, rendering the cow sterile. In both cases early diagnosis is essential otherwise the infections may become widespread in the herd before the farmer realises the gravity of the position.

Other Causes.—1. A long interval between calving and service reduces the prospects of conception.

2. Infertility may be due to dietetic errors.

3. Some animals do not come into season at the period planned for service. Treatment by a veterinary surgeon can often correct this condition.

4. An increasingly large number of cows, which have not held to service, do not come in season again at the normal period and are consequently believed to be in calf until they come in season some months later. Pregnancy can, however, be diagnosed by the veterinary surgeon from about nine weeks after service and early diagnosis will not only save months of breeding time, but will enable remedial treatment of non-pregnant animals to be undertaken without delay and with greater prospect of success.

5. The bull may be responsible for infertility in the herd.

6. Causes of less frequent occurrence include congenital defects, and injuries at calving, etc.

What the Farmer should do

1. Avoid a long interval between calving and service.
2. Keep a record showing:—
   (*a*) Dates of oestrus, commencing from the first occurring after calving—dates to be recorded whether or not the animal is served.
   (*b*) Dates of service.
   (*c*) Identity of bull used.

(*d*) Dates of calving or abortion; abortions to be recorded as such.

3. Report to the veterinary surgeon any cow which does not come into season within 60 days after calving.

4. Withhold from service any cow showing any abnormality in the length of the oestrus cycle (normal 18 to 22 days) or showing any abnormal vaginal discharge. Report such cases to the veterinary surgeon.

5. Report any animal which aborts and, if practicable, isolate such an animal pending further advice.

6. Report any cow or heifer which appears normal, but does not hold to any of three successive services by a bull known to be fertile.

7. If service records suggest that the bull is infertile, the veterinary surgeon should be informed without delay.

What the Veterinary Surgeon should do

1. At each quarterly inspection, carry out examinations for pregnancy and treat or give advice concerning those animals found not to be in calf.

2. Collect such material as may be necessary for laboratory examination.

3. Pay such other visits and carry out such treatment as may be necessary for the control and prevention of infertility.

JOHNE'S DISEASE

This is an incurable contagious disease of cattle due to infection of the bowel by a particular organism. The symptoms are diarrhoea and wasting. Once the disease is diagnosed in an animal it should be sold for slaughter as soon as practicable, since infection is spread to pastures and drinking places by the highly infective dung of the affected animals. Only the early removal of infected animals and hygienic measures can control this disease, which is widespread throughout the country, though it is only in some districts that the incidence is so high as to be a serious problem.

It may be regarded predominantly as a disease of adult cattle, since, though young animals are very susceptible, a long period usually elapses between infection and the appearance of clinical symptoms. Infected cattle may, however, spread infection before the disease is sufficiently advanced to produce clinical symptoms.

Farmers should report to the veterinary surgeon any suspicious cases of recurrent or persistent diarrhoea. Microscopical examination of the faeces or a piece of membrane from the bowel will assist in diagnosis, but the existence of the infection in the herd may only be definitely established on *post-mortem* examination. Having established that infection is present, the veterinary surgeon will advise on what steps can best be taken to control the disease, but measures which will be generally applicable are:—

1. The elimination of all actively affected animals from the herd.

2. The exclusion of young cattle from grazings occupied by older animals.

3. The fencing-off of watering places which may readily become infected and the installation of water troughs to which water may be piped from streams or other sources.

4. The ploughing-up of heavily infected pastures since infection will persist for months.

5. If ploughing-up is not practicable, rough harrowing of pastures to break up dung so as to expose it to the disinfectant action of bright sunlight.

6. Liming of pastures and the feeding of a suitable mineral supplement have beneficial effects.

Maintaining the Milk Supply

PRODUCTION DEMONSTRATIONS IN CHESHIRE

On Saturday last our President and a number of colleagues visited a demonstration at Middlewich arranged by the War Agricultural Executive Committee for Cheshire, and there, from the same platform as the Minister of Agriculture, brought the scheme for the control of the major diseases of cattle to the notice of nearly 3,000 farmers, emphasising the part the practitioner can play in the control of disease. The Association contributed a series of demonstrations in this regard, and these appeared to evoke greater interest among the farmers than any other items in a most informative practical programme, with exhibits, which embraced the following subjects affecting milk yields: diseases of dairy cattle, dairy hygiene, grassland improvement, winter milk, silage, straw pulp and wire worms.

The value and importance of the proceedings in the eyes of the Ministry was exemplified by the presence of the Minister, who opened them at a meeting which was also addressed by Professor Sir George Stapledon, Director of the Ministry's Agriculture Grassland Improvement Station, and Dr. W. R. Wooldridge, President of the National Veterinary Medical Association.

Mr. Hudson emphasised to the assembled farmers the seriousness of the food production position and the responsibility now devolving upon the home producer, exhorting them to increase the amount of milk. He stressed the fact that, in this connection, they should pay particular attention to the proper use of grassland and to the control of diseases of dairy stock.

Professor Stapledon dealt with the importance of choosing only the best grasses and of including grassland in the scheme of rotation.

Dr. Wooldridge (President, N.V.M.A.) stated that an increase of milk could be obtained from improved animal management and feeding, from better breeding and from the control of disease: in all three directions the farmer could obtain considerable assistance from members of the veterinary profession. Although better-keeping milk could be secured and wastage reduced by the adoption of more hygienic conditions on certain farms, little could be done under present conditions to improve the milk yield by the choice of foods.

On the question of animal breeding, skilled advice would generally pay in the selection of proper stock and in ensuring that mating stock was free from disease. The average yield per cow was nowadays just over 500 gallons per annum, but with a better selection of bulls this average could undoubtedly be increased to 750 or even 1,000 gallons. The time taken to bring about this increase could be materially shortened by the careful use of the method of artificial insemination but this method should only be employed under veterinary advice.

The method most likely to increase the volume of milk within the next few months from the same amount of stock would therefore be the vigorous adoption of a scheme for the control of the diseases in farmstock. To assist in this national effort the veterinary profession, in consultation with the National Farmers' Union and the Ministry of Agriculture, had evolved a scheme for tackling the four major diseases of dairy cattle, and the Government had granted certain generous facilities to those entering the scheme. The profession, being a "reserved" one, had decided to accept fees somewhat lower than it would otherwise have wished, to put this scheme into effect, as a major contribution to agriculture's war effort. Under the scheme the services of the veterinary practitioner would be made available to the farmer for the improvement of the health of his stock and the control of these four diseases, and professional assistance would be available also at a time when it would have its maximum effect, for it was economically unsound for the farmer to utilise the knowledge and advice of the veterinary surgeon only when his animals were in an advanced stage of illness. His services would be found to be much more valuable in connection with breeding, animal management and feeding, and the control of disease—taking the herd and not the individual animal into consideration.

The profession alone, however, could not effectively carry out the scheme; it must have the full co-operation of the farmer.

In the course of his address Dr. Wooldridge emphasised his points by giving figures of losses arising from the presence of the diseases which it is the purpose of the scheme to control.

The demonstrations in connection with the diseases of dairy stock were as follows: pregnancy diagnosis, temporary infertility and sterility—Mr. H. W. Steele-Bodger, Chairman of the Survey Committee, N.V.M.A.; mastitis; artificial insemination—Mr. S. L. Hignett, Veterinary Investigation Officer, Leeds University, assisted by Mr. G. S. Powley; contagious abortion—Dr. C. K. Mingle, and Johne's disease—Dr. Norman Barron. The Association was fortunate to be able to call upon the services of Dr. Mingle who, at the request of the President, readily undertook to take the place of Mr. W. T. Rowlands, who was unable to be present to demonstrate on the subject of abortion.

Control of the Major Diseases of Dairy Cattle

AGRICULTURAL JOURNALISTS AND THE SCHEME

At the invitation of the Guild of Agricultural Journalists, representatives of the Ministry of Agriculture, the National Farmers' Union and the National Veterinary Medical Association attended a meeting of the members of the Guild held at the Farmers' Club, Whitehall Court, S.W.1, on Thursday of last week, to acquaint them with the aims and principal features of the scheme for the control of the major diseases of dairy cattle, shortly to be brought into operation.

Mr. R. W. HADDON, Chairman of the Guild, who presided, extended a cordial welcome to the speakers—Mr. H. German, Chairman of the Diseases of Animals Committee of the National Farmers' Union, Mr. D. A. E. Cabot, Chief Veterinary Officer of the Animal Health Division of the Ministry of Agriculture, and Mr. H. W. Steele-Bodger, Chairman of the Survey Committee of the N.V.M.A.

Mr. H. GERMAN said that he had been connected with the animal section of the Ministry since the foot-and-mouth days of 1922 and

it was with great pleasure that he saw the formulation of a scheme for dealing with animal diseases, in 1940. That was welcomed by the National Farmers' Union, because they realised that the ravages of disease were taking a great toll of the livestock of the country, and they gave all credit to the National Veterinary Medical Association for dealing with those four major diseases of dairy cattle, mastitis, contagious abortion, sterility and Johne's disease. They now saw that it was absolutely the right thing: they felt that those four main diseases should be added to the effort to stem bovine tuberculosis. They had been working at the scheme for nearly two years and they had now arrived at a memorandum which was acceptable to the Ministry of Agriculture and to the majority of veterinary surgeons, and he was pleased to say that the great proportion of their county branches had accepted it as a basis on which they could start fighting those diseases in the hope that they could at last subdue the ravages which they were creating at the present time. They were going to do what they could to get their people to work that scheme. One of the main things their men would have to do would be to give every possible help and assistance to the veterinary profession in fighting those diseases.

Taking sterility first, that did not immediately affect the food and drink of the people, but it was reducing the quantity of milk produced, in the long run, because it lay dormant over a long period. Regarding abortion, the Ministry of Health were now allowing the use of the live vaccine. In respect of mastitis, he thought they were coming to the day when the veterinary profession could keep it in subjection altogether; about Johne's disease he was doubtful.

The wholehearted assistance of his hearers would be required. Thanks to government assistance in regard to some drugs, and the enthusiastic way in which the veterinary profession were coming into the scheme, he thought success was assured. He felt that the fees the practitioners were asking were reasonable and would, without any doubt, make the extension of herds a paying proposition, although they had to pay these fees.

He wanted to impress on the dairy farmers of this country that this voluntary scheme was first class in every way, and that it would, if they went wholeheartedly into it, pay them to do it and save them much money. As Chairman of the Animal Diseases Committee, and as far as the President of the National Farmers' Union was concerned, they would do their utmost to back up the Ministry of Agriculture and the veterinary profession in their efforts to help the country by preventing disease in connection with what was probably the most valuable product of the land of this country—milk—which was so urgently needed at the moment. He thought it would only be through the Press that they could get their people to look at that great voluntary scheme in a proper spirit. At the present moment the Union and the county branches were strongly in favour of it. There had been some doubt as to whether or not the scheme should be compulsory and he himself thought that when his people began to realise the benefits of the scheme it would not be many years before it was compulsory.

Mr. D. A. E. Cabot said that he thought it was common ground that the diseases which were most serious from the point of view of the dairy farmer were mastitis, contagious abortion, defects in breeding and Johne's disease, and the scheme offered a comprehensive veterinary service in regard to all these conditions. Mastitis was not just a single condition and the most prevalent form of it was due to a particular organism which was probably responsible for 80 per cent. or more of mastitis troubles in dairy herds. The infection was generally carried by milkers' hands and milking machines from an infected cow to a healthy one. However, the condition was reasonably amenable to treatment. They were not offering a scheme of eradication of this particular type of mastitis: eradication presented the utmost difficulties, but the disease could be kept in check by reasonable hygienic precautions and by suitable treatment of the clinical cases at any time during the course of lactation without detriment to the milk yield, and in the case of chronic infection by infusion of the udder when the cow was being dried off. The sulphonamide treatment, as well as the infusion, did not sterilise the udder in more than about 30 per cent. of cases: they yielded clinically quite good results, but infection still remained in the udder tissues in the majority of cases.

In regard to contagious abortion, which was probably the second chief cause of loss of milk in dairy herds, again they were not offering a scheme of eradication—they were offering mainly a scheme of control of disease in the herd. In war-time they could not expect people to undertake measures of eradication, which meant segregation of the infected animals from the non-infected, or removal of the infected which was impossible under present conditions. They would offer two types of abortion vaccine at the option of the farmer. The standard vaccine which they would offer was one that might be used with adult animals or with calves. It was a curious thing that while calves born from infected dams were nearly always infected at birth, that infection seemed to have no beneficial results in producing immunity as they grew older. At six to eight months they might vaccinate these calves and they developed resistance to infection after they had been served. Another interesting thing about this vaccine was that the animals did not react to the agglutination test when they were vaccinated as calves, but as they grew older they reacted to the test. That vaccine was used in one dose. The other was used in two doses and it did not cause a reaction to the agglutination test after vaccination so that in some herds when owners were very anxious to immunise their animals but to be able to sell them on the strength of having passed the agglutination test, that vaccine would be suitable for that purpose. In the light of present knowledge, it was not suitable for vaccination of calves.

In regard to sterility, this had something in common with mastitis in that it was not a single trouble. It might be due to a variety of causes. It might have been thought that with the outbreak of war, bringing reduced food supplies and a reduced milk yield, breeding would have been more regular; but sterility was more prevalent and that was due in the main to infection of the uterus. In order to have an adequate service in regard to the breeding capacity of cows it was very important that the state of pregnancy of the animal or otherwise should be determinable: it was determinable at round about ten weeks after service if the cow was pregnant. In many cases treatment by washing out the uterus would put the affected animals right, but it was not the simple operation that many farmers thought. No doubt much sterility must be regarded as a sequel to contagious abortion, so that to some extent control of abortion would check a proportion of cases of sterility occurring in cows.

Concerning vaccines, live vaccines issued by the Ministry of Agriculture might be used in tuberculin tested herds in which the presence of contagious abortion had been shown to exist. The Ministry of Health would not have live vaccines used in tuberculin tested herds which were free from infection. The Ministry of Agriculture recommended that vaccines should not be used in herds which were free from infection: there was still some doubt as to the behaviour of the organisms when they were put into the animal's system, and what might happen in the course of time.

In regard to Johne's disease, its incidence was variable. They must remember that it was a serious disease and that it carried off cows in the prime of life and usually a very short time after they had calved—in other words, just when they were in the full flush of milk. Hygienic measures could go a long way in protecting cattle, especially young stock, against infection.

The scheme was a voluntary one. He had seen an estimate of the number of herds that might come under control—whether it was to be proved right or wrong he did not know—but he would like to say this: that the control of these diseases in dairy herds was perhaps not entirely to be assessed in due course by the number of herds which came under this scheme. He knew that a great deal of attention had been given to the control of mastitis and that a great deal of attention was being devoted to the examination of cows for pregnancy and when necessary for treatment, because farmers were realising more than ever in these days that the replacement of cows was a very expensive matter and that the control of barrenness was something well worth doing. There was abundant evidence that farmers and veterinary surgeons were more and more interested in the problem of sterility. Whether the work was done under the scheme or whether it was not was perhaps immaterial, provided it was being done. He thought the cheapest way was to come into the scheme: the farmer knew what it was going to cost him. He hoped that, within or outside the scheme, the work now being done would continue to extend.

There was one observation that appeared in a newspaper article the other day with which he would ask Mr. Steele-Bodger to deal, and that was the question of a dispute that might arise in this work between the farmer and his veterinary surgeon.

In regard to the general situation of the health of dairy herds, there was no doubt that a great deal of the trouble found to-day was due to the purchase of cattle; people had given up rearing their replacements—they bought odd animals and by thus bringing disease into the herd reduced its fertility and so the vicious circle began. He hoped the practice of farmers of retaining their best heifer calves for rearing would be extended.

Mr. H. W. Steele-Bodger (Chairman of the Survey Committee, N.V.M.A.) said he thought that it was generally known that this scheme originated as the result of a report which was issued by the N.V.M.A. That report was drawn up by the Association's Survey Committee. The veterinary profession was the only profession now totally reserved and they felt that it was up to them to do something to merit that reservation. Many members of the profession felt that they did not wish to be reserved, but total reservation was in force and the only reason for that was to assist agriculture to maintain and, if possible, increase the amount of meat and milk available, by the prevention or control of disease, particularly the diseases of dairy cattle.

The Survey Committee, therefore, set out to assess the amount of the loss caused by these major diseases. The Committee found that the loss to the country was in the neighbourhood of 200,000,000 gallons of milk per annum. He would like to emphasise the point that when they estimated these losses they were working on a milk value of 1s. 3d. a gallon: last month milk was 2s. 6d. a gallon—a fact which materially increased the annual monetary loss in this country due to milk wastage and which could not be less than £25,000,000 a year. That, as Mr. Cabot had indicated, was made up of losses due to a variety of causes: loss of milk, loss of calves and replacement costs of cows affected with these diseases. In regard to mastitis it was not only the actual loss of milk, but it was known that milk from mastitis-affected cows had a lower solid-not-fat content (a reduction of 8·7 to 8·3 per cent.). There was also a reduction of 25 per cent. butter fat in the milk from affected cows.

In the report published by the Association it was made clear that, owing to the diminution in the milk yield and to the impaired quality of milk from diseased animals, there is a loss to the nation arising from the presence of mastitis, contagious abortion and sterility of over 83,000 tons of a solid mixture of protein, sugar and minerals, and a loss of over 31,000 tons of butter-fat. To import an equivalent amount of material would necessitate the use of valuable shipping space which could ill be spared.

At the outbreak of war it was thought that mastitis was the most important disease of dairy stock. It might well be that mastitis was still the most important disease, but the picture had in a sense altered because the losses due to mastitis were more insidious, whereas the losses due to infertility were now very apparent: in pre-war days it did not matter very much if herds carried a few passengers for six or twelve months; now it was a very important matter—every animal in the herd to-day must pay its way. The disease which certainly startled the farmer more than anything else was that which resulted in either temporary or prolonged infertility, necessitating the weeding out of an animal for, say, £20 and its replacement at £40, £50 or £60.

As they knew, the Association drew up that report and the scheme. These were submitted to the Animal Health Division of the Ministry of Agriculture, the Agricultural Research Council and the National Farmers' Union, and discussions took place. He himself fondly imagined that all one had to do was to produce a scheme and it would be put into operation at an early stage; one now realised that the mills of government, like the mills of God, grind slowly. (Laughter.) This must not be construed as a reflection on the Government: he appreciated that there were many factors and interests which had to be considered. They had hoped the scheme would be put into force in time to influence the milk supply of the winter of 1940: then of 1941; it was now too late to influence the milk supply of next winter in so far as infertility was concerned; but, as Mr. Cabot had indicated, a lot of work was being done now in anticipation of the scheme and whether the scheme, as a scheme, was a success or not, there was no doubt that farmers had become more disease conscious and veterinary surgeons had become conscious of their ability to control those diseases.

He would like to underline something referred to by Mr. Cabot: he did not think that the gentlemen of the Press appreciated the difference between 'eradication" and 'control." Most of the critics, both inside and outside the veterinary profession had criticised the scheme because they said that they could not eradicate those diseases; he agreed with Mr. Cabot that there was grave doubt that they could ever be eradicated. Control, however, was a different matter and the degree to which they could control these diseases depended upon three factors. He would put them in the order of what he deemed to be their importance: (1) upon the degree of willing co-operation which they, as a profession, received from the individual stockowner; (2) upon the degree of willingness of the practitioner to co-operate and apply the recommendations contained in the scheme and (3) upon the incidence of disease in the herd. He put them in that order because, as a practitioner, he would far sooner have to deal with a herd in which the incidence of all these diseases was high, and be assured of the willingness of the stockowner, if he were attempting to tackle these diseases, than a herd with a much lower disease incidence, and merely the passive acquiescence of the stockowner. Nothing the veterinary surgeon could do on his own would make any difference to the incidence of disease.

If any disputes arose they would be referred to a conciliation committee. The word "conciliation" was chosen deliberately; the conciliation committee would not be able to enforce any of its findings, but it would be able to smooth out difficulties. He did not think that these committees would be kept very busy; most of the difficulties he could visualise were unlikely to arise—they would not arise if there were a spirit of give and take between the farmer and his practitioner. The greatest limiting factor, apart from lack of co-operation, he conceived to be shortage of labour. It was absolutely inevitable that if the farmer were to do his best in this scheme he must have adequate labour which was essential if he were to employ the appropriate methods of hygiene which were required.

He did not think it was necessary for him to stress what was required of the farmer in connection with these various diseases, because he thought this information would be available in pamphlet form, but he might say that in connection with every one of these diseases it was necessary to go to a little more trouble in preventing and controlling infection.

In regard to infertility it was necessary for the farmer to keep records. If he were not absolutely convinced of the necessity for this he would not ask the farmer to keep another record, because he had enough to keep already. During the past six months he had been engaged in examining cows for pregnancy and treating them for infertility in various parts of the country, and he had been aghast at the number of farmers who had no idea of any of the factors relating to the cow and its calving. He had examined many hundreds of cows and large numbers of them, believed to have been in calf, even in an advanced stage of pregnancy, were barren; also a large number which had been prepared for grading because they had been seen to either take the bull or show symptoms of oestrus, and yet these animals had proved to be in calf, some of them in an advanced stage of pregnancy. Again, this winter there must have been thousands of animals which never came into oestrus at all. That was a grave problem which faced them next winter. Facilities would, he thought, have to be granted next autumn for the supply of the suitable biological products for use in this work. It was quite obvious, with the price of these products, they could not be utilised within the scheme; they must either be provided as an extra and paid for by the farmer, or they must be provided by the government, possibly at a reduced price. The "answer to prayer" would appear to be a special biological product, but it was fundamental that it be used only when, after expert examination, one was satisfied that the animal was (*a*) not pregnant, (*b*) in a 'dead' state. It would make a big difference to the number of animals which could be brought to bulling.

Mr. Steele-Bodger proceeded to give two instances to show what the farmer could be saved, provided he sought veterinary advice, and continued by saying that the greatest advantage of that scheme was that it provided an opportunity of calling in the veterinary surgeon at an early stage; the essential factor in this work was early access to the herd so that treatment might be applied as soon as possible.

With regard to abortion, nothing could be done once the animal was in calf. He had about 50 herds under control with one of the vaccines to which Mr. Cabot had referred, namely the one which did not cause a reaction to the agglutination test. He had found that the greatest drawback to that or any scheme was this: that the farmer did not appreciate that he must delay for one or two months after vaccination before he put the animal to the bull. He did not think it would be out of place if he said there that the work on that vaccine had been done entirely by a British veterinary surgeon. That veterinary surgeon, Dr. McEwen, had done more actual statistical research into vaccination than had any other individual in the world. Mr. Cabot had said that these animals required two doses of vaccine; that was so with the maiden heifers, but they did not give two doses of vaccine to animals that had calved once.

With regard to fees, most people knew them and all he would say in that connection was that these fees were a great concession on the part of the veterinary profession. They would never have operated in peace-time; they represented the acceptance by the veterinary profession of the fact that it had a job to do in the national interest, and it was for that reason that the Association had agreed to the lowness of that figure. It was agreed that the scheme should be reviewed after twelve months; nearly twelve months had now elapsed—prices of drugs and the costs of the veterinary surgeon had gone up very much in the interval. There were many veterinary surgeons who would be out of pocket if their clients sought assistance under the scheme, but he believed it was a fine thing for the country, for agriculture and for the veterinary profession as a whole. The scheme was not perfect, but it was a beginning, and it could be modified in the light of experience. It was probable, he thought, that other schemes would follow. The Survey Committee of the N.V.M.A. had considered control of diseases of sheep and pigs, calf diseases, bovine tuberculosis, also artificial insemination, etc., and it was about to discuss parasitic diseases. In the discussions which had taken place the Committee had the advantage of the assistance of experts of veterinary and allied sciences, to whom he wished to express his thanks and appreciation.

In reference to artificial insemination, he believed it had come to stay, but it was not "the answer to the maiden's prayer." (Laughter.) It would act as an important factor in raising the quality and in the control of venereal disease of stock—but it would not cure infertility; it was a *sine qua non* that the animal inseminated must be a healthy animal.

In the view of his association and of the veterinary profession the

trend of veterinary work in the future must be rather in the direction of herd control of disease than the cure of disease in the individual animal. The veterinary profession of the future must concern itself more with the maintenance of health. Whether there might arise points in regard to long-term practice must be left; in his view the future of the veterinary profession, in spite of dog practice, etc., was essentially bound up with agriculture. A successful agriculture was essential to a successful veterinary profession, and a successful veterinary profession was vital to a successful agriculture. They hoped the scheme would be a success, but they did not promise anything other than that, with the active co-operation of the stock-owner, they would do their best.

. . . . .

The following were among the answers given to a short series of questions from members of the Guild of Agricultural Journalists :—

Mr. Steele-Bodger said that it was a waste of time to treat cows for infertility and restore them to health if they were going to be put to an infected bull afterwards.

He would be very sorry to wait until pedigree breeding became universal, before putting into operation a system of breeding recording.

For the purpose of their scheme it did not matter whether the animals were pedigree or not; the essential thing was that a record of date of oestrus and service, etc., should be made.

In reply to a question as to whether diseases in cows would not be reduced because they had now to come to a more natural method of feeding, Mr. Steele-Bodger said that, taking the problem by and large, the greatest cause of infertility was infection, but in certain herds another potent cause was faulty feeding. During this last winter many thousands of animals received a deficiency of suitable food. His experience of farmers led him to believe that if they were given sprouted wheats or oats to give to bulling heifers a lot of those materials would find their way into the cows' mangers.

Mr. Cabot stated that the use of live vaccines was to be restricted to infected herds.

At the moment the scheme was applicable to England and Wales and discussions were taking place in regard to its application to Scotland.

Mr. Steele-Bodger said that the Chamber of Agriculture for Scotland, as late as the previous week, had informed the members of the association that they whole-heartedly approved the scheme; they considered it would do an immense amount of good. The question there was simply as to whether the contract should be an individual contract or a flat rate contract. That matter was being considered by the Scottish Branch of his association. He had no doubt whatsoever that a solution would be reached and he hoped that the scheme would be put into force in Scotland at the same time as it was in England.

In reply to a further question, Mr. Steele-Bodger said that the total gallonage of milk lost through these four major diseases was approximately 200,000,000 gallons per annum.

Following the questions Mr. Nevile, President of the National Farmers' Union, said that the reason for his presence there was that he wanted to do what he could to emphasise the importance that the National Farmers' Union attached to that scheme and to express their appreciation of the trouble that had been taken in drawing it up, and guiding it through, by the veterinary profession and the Ministry of Agriculture. As to the Press, they had rendered great service to the organisation over which he presided, but he would impress upon them, and through them their readers, that the National Farmers' Union was not primarily a "price problem" organisation. He would ask them, therefore, to bring to the notice of the people of this country that the farmers and their association were really interested in research, education, food organisation and anything that would promote the greater efficiency of agriculture. Mr. Steele-Bodger had referred to the mills of the Ministry of Agriculture grinding slowly, but he would confirm him in saying that they could not have any publicity about that scheme until it was brought actually into being. The National Farmers' Union and its organisations were trying to do all they could to promote all these important objects, which would bring a more efficient agriculture, which would be at the service of the people of this country.

Replying to the Chairman's expression of indebtedness to Mr. Cabot, Mr. German, Mr. Nevile and himself for their attendance and speeches, Mr. Steele-Bodger said that the support of the agricultural Press would be highly valued by all those concerned with the control of the diseases of the livestock of the country.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

May 29th.—Meeting of the South Wales Division, N.V.M.A., at Carmarthen, 2 p.m.
June 2nd.—R.C.V.S. Committee and Council Meetings, York.
June 3rd.—R.C.V.S. Annual General Meeting. Committee and Council Meetings.
Victoria Veterinary Benevolent Fund Annual Meeting, York.
June 5th.—D.V.S.M. Written Examination commences, Edinburgh.
June 9th.—D.V.S.M. Oral and Practical Examinations begin.
June 25th.—R.C.V.S. Written Examinations begin.
June 29th.—R.C.V.S. Oral and Practical Examinations begin.

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Car Tyres

The N.V.M.A. is advised that members of the profession who experience difficulty in obtaining tyres should seek the assistance of the Ministry of Supply (Tyre Control), Empire House, St. Martin's-Le-Grand, London, E.C.1. Applicants should give the following information: 1. Size of tyre required; 2. Make of tyre required; 3. Minimum number of covers and tubes required; 4. Name and address of usual tyre supplier.

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Dr. C. K. Mingle

Our readers will be interested to learn the circumstances in which Dr. C. K. Mingle is in this country and working at the Veterinary Laboratory, Ministry of Agriculture, Weybridge.

Dr. Mingle is on the staff of the Beltsville Research Station of the Federal Bureau of Animal Industry of the United States Bureau of Agriculture. He has been deputed by the United States Government to collaborate with the Ministry of Agriculture in its work on immunisation against bovine contagious abortion and demonstrate certain work on the subject that has been developed in America; he expects to stay with us for a few months.

Dr. Mingle took the degree of D.V.M. at Ohio State University, graduating in 1930. Later he secured his M.Sc. and he has almost completed his studies for the Ph.D.

For two years he was lecturer in Veterinary Bacteriology and for one year lecturer in Preventive Medicine at the University. He is a member of the Delta Chapter of the Phi Zeta Society, which is open only to distinguished students and is a much sought honour in American universities.

Dr. Mingle joined the Department of Agriculture at Beltsville, just outside Washington, D.C., in 1935, and since then has devoted his time to studies on brucellosis and made important contributions to the literature on the subject.

He was flown across the Atlantic in a bomber towards the end of the winter—a very unusual experience for a veterinarian.

Dr. Mingle shows great interest in all veterinary activities in this country and likes to discuss veterinary affairs with his British colleagues. To the extent to which his duties permit, we understand that he would welcome opportunities to see and hear about veterinary activities on this side of the Atlantic. He has had the privilege of travelling to many parts of the country with Professor Dalling and with our President, Dr. Wooldridge, and has found these visits most interesting and helpful.

* * * * *

FUNERAL OF MAJOR-GENERAL SIR LAYTON BLENKINSOP

The funeral service for Major-General Sir Layton John Blenkinsop was held on May 1st at Melbourn Parish Church, Cambridgeshire. The Rev. H. H. McNeice officiated. The coffin was draped with a Union Jack on which were the General's plumed hat and sword, and the local branch of the British Legion mounted a guard of honour.

Members of the family and others present included: Lady Blenkinsop, Mrs. Wells and Mrs. Speer (sisters-in-law), Miss Wait (niece), Mr. J. Wells; Major F. W. Willis (representing Lieutenant-General Sir Edward and Lady Altham), Captain E. Brayley Reynolds (representing the National Veterinary Medical Association), Colonel S. G. R. Wells, Brigadier C. A. Murray (director,

Army Veterinary Services), Major Murphy, R.A.V.C., Canon Burrell, and Miss Burrell.

Cremation took place at Cambridge.

A preliminary notice of Sir Layton's career appeared in our last issue and a memoir will be published next week.

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ARMY PROMOTIONS

The following announcements are made in the issue of *The London Gazette* dated May 5th, 1942:—

Lt.-Col. G. A. Kelly (4675) from R.A.V.C., to be Col. Dec. 1st, 1941.

ROYAL ARMY VETERINARY CORPS

Maj. R. M. Bamford, O.B.E., (11349), to be Lt.-Col. Dec. 1st, 1941.

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Erratum.—We regret that, through a printer's error, a mistake occurred in the following sentence in the memoir to Colonel G. K. Walker published in our last issue, in which (p. 186, col. 2, para. 2) the annual budget figure for the Punjab Civil Veterinary Department was unfortunately given as £1,800. The sentence should read: "Now it has an organisation with over 300 well-equipped veterinary hospitals, well over 400 qualified veterinarians and a budget of £180,000 per annum."

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RATIONS FOR DAIRY HERDS

In a joint statement recently issued, the Agricultural Departments and the Ministry of Food say that, as previously announced, the coupons issued for dairy cows during this summer will be for cereals and protein feeding-stuffs in equal proportions; the Protein Coupons will be endorsed "D" and of the protein feeding-stuffs supplies against them one-third must be undecorticated cotton cake.

Dairy farmers who wish to buy either National Cattle Compound No. 1A (Dairy) or National Grain Balancer are not required to feed straight cotton cake as their one-third share, for it will be included as an ingredient in those compounds. They may deposit equal proportions of "D" Protein and Cereal Coupons and obtain either National Cattle Compound No. 1A or National Grain Balancer to the extent of the total value of the coupons so deposited. Those who wish to purchase a high protein concentrate as licensed by the Ministry of Food, must deposit Protein Coupons, and if those coupons are endorsed "D" they may only receive the concentrate to the extent of two-thirds of the coupons deposited, as no undecorticated cotton cake is included in the concentrate. The remaining one-third must be taken in the form of undecorticated cotton cake. Arrangements are being made for all dealers in licensed high protein concentrates to stock undecorticated cotton cake to supply the needs of farmers surrendering to them protein coupons endorsed "D."

In some areas of the country, there are appreciable quantities of undecorticated groundnut cake and it has now been decided that farmers may, at their option and if supplies are available, take undecorticated groundnut cake instead of cotton cake as their one-third share of the protein supplies.

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H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

	Price net s. d.	*Post free* s. d.
HEALTH, MINISTRY OF:		
Circular 2635. Milk (Special Designations) Regulations, 1936 to 1942. Use of Live Abortus Vaccines in Tuberculin Tested Milk Herds, May, 1942	0 1	0 2
STATUTORY RULES AND ORDERS, 1942:		
771. Milk and Dairies, England and Wales. Milk (Special Designations) Regulations, April 21st	0 1	0 2
SCIENTIFIC AND INDUSTRIAL RESEARCH, DEPARTMENT OF:		
Food Investigation Special Report 51. The Composition of the Depot Fats of Aquatic Animals. (By J. A. Lovern, D.Sc., PH.D., F.I.C.) (47-8-51)	1 6	1 8

MAINTENANCE OF BREED PURITY THREATENED

Commenting on the observations of a correspondent to *The Cumberland and Westmorland Herald* who deplores, as one result of the war-time change-over in the local farming world from butter-making and calf-rearing to milk selling, the inevitable neglect of maintaining breed purity, *The Farming News* observes, "As he puts it, as the result of the monthly milk cheque, many farmers now cross their cattle 'thereby destroying in a year the work and care of generations, the only object being to produce more gallons of milk.' He emphasises that the result is apparent wherever one goes—'cross-bred mongrel kine of all colours and shapes, from half castes to octoroons whose only redeeming feature is the possession of a 'bag'." It should not be forgotten that desperate diseases need desperate cures, and even heavy sacrifices are required to maintain a sufficiency of that vitally necessary article of human food—milk—but it would certainly be a disastrous post-war situation if the result were to mean a serious dislocation of straight breeding. The fault cannot be overlooked that even in registered cattle herds there are found in the yearly production of young stock what might well be termed 'mongrels,' which ought to be speedily transferred to the hands of the butcher, but careful registration is valuable and one would wish to see it continuing unchallenged despite 'milk cheque' temptations."

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THE FODDER PROBLEM

"In a time of fodder shortage it is quite remarkable what experimentation may produce towards relieving the situation," states *The Farming News* in a recent issue, and continues: "According to a communication we have from the Swedish International Press Bureau an important source for alleviating the critical fodder situation in that country has been the so-called cellulose fodder produced in large quantities by the pulp mills. This fodder, it seems, has been found a great boon in providing the animals with a sufficiency of calories. So great became the demand that the Swedish Farm Research Institute proceeded to investigate the possibilities of using sulphate cellulose and the result was exceedingly favourable as marked by the high consumption of this type of food. Cellulose fodder is primarily suitable for milk cows and horses, and through the use of this substitute a certain proportion of grain and straw fodder is saved and can thus be used for feeding poultry and other animals. Successful experiments have also been made at Swedish agricultural institutes for eking out the cow's feed portions with spruce and pine needles. They have been proved to have the same fodder value as straw."

* * * * *

A Ministry of Food instruction that hearts from carcases condemned on account of tuberculosis were, in future, not to be surrendered for destruction if found free from disease, has been discussed by the Hospitals Sub-Committee of the Health Committee of York Corporation. At the end of the discussion the Sub-Committee asked the Town Clerk to submit a strong protest.—*Meat Trades Journal.*

QUESTIONS IN PARLIAMENT

ANIMAL MEDICINES

Mr. WOOTTON-DAVIES asked the Minister of Agriculture whether, in view of the limited amount of raw materials available, he will take steps to enforce, by regulation, that all packages and containers of animal medicines give an indication of the composition of the contents, as in the case of proprietary medicines for human consumption, in order that farmers can be certain that they are suitable and necessary for the purpose?

Mr. HUDSON: I have no powers under existing legislation to impose a requirement of the kind suggested. Nor have I any reason to suppose that it would achieve the purpose indicated in the last part of the Question.

. . . . .

STRAW PULPING PLANTS

Mr. DONALD SCOTT asked the Minister of Agriculture under what safeguards and conditions straw pulping plants are to be issued free to farmers by his Department?

Mr. HUDSON: Straw pulping plants will be supplied free to farmers in cases where their installation is approved by the county war agricultural executive committees. I am sending the hon. Member a copy of a leaflet which is being issued by my Department giving details of the offer.

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.
The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THE PROFESSION AND PUBLICITY

To the Editor of the Veterinary Record

Sir,—Having noticed of late that there has been correspondence in your paper about publicity for the profession, I would like to state how impressed I was with the demonstrations staged by the "National" at the Milk Production Demonstration held last Saturday at Bostock Park, Middlewich, Cheshire. Judging by the intense interest shown by the farmers, I maintain that such activities are the kind of publicity we require and should be repeated all over the country.

Yours faithfully,

"Brooklands," R. F. Bett, Major R.A.V.C.
Hough, Nr. Crewe.
May 11th, 1942.

* An account of these proceedings is published on page 196 of this issue.—*Editor.*

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WEYBRIDGE TUBERCULIN

To the Editor of the Veterinary Record

Sir,—It was very refreshing to read Hubert Gillmor's letter in the issue the *Record* of May 2nd, and to hear from the Editor that the Ministry are going to give the profession some facts *re* tuberculin. If the Ministry are to blame for anything, it is for being reticent. If it had been possible for them to have given those facts, that they intend to do now, sooner, then there would have been less bunkum spoken and written!

I think it can be taken for granted that the veterinary practitioners in the West of Scotland have had some experience of testing, and what they have had must be treated with some degree of credence. My experience goes back 30 years. During that time tuberculin has passed through many phases; with the old tuberculin we had many unfortunate experiences and disastrous breakdowns. Since the introduction of the Weybridge product these have been reduced to a minimum, and with the comparative test, although tedious, the doubtful reactor is no more a bogy. The satisfaction shown by dealers that the test is trustworthy is all to the good. Hundreds of cows pass through their hands and markets in our area (West of Scotland) weekly, and I have yet to hear of any serious trouble, provided the transport arrangements are carried out properly.

The various breed societies have notified their different members in our district to report on any discrepancy in the results of their test, only to find complete satisfaction. Where the human element comes in, it is impossible to get 100 per cent., but in my experience this tuberculin is as near as can be to that ideal.

Yours sincerely,

154, Greenock Road, J. Andrew.
Paisley.
May 2nd, 1942.

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BOVINE INFERTILITY

To the Editor of the Veterinary Record

Sir,—Like Mr. Esmond Brown, the majority of your readers must have recognised a warning in Mr. Smythe's letter of March 9th, in which reference was made to "pinching the ovaries." We are liable for certain acts of negligence or want of skill always, but a special warning appeared in the *Record* of March 14th. Practitioners were advised to obtain insurance cover against claims by owners in connection with pregnancy diagnosis and the treatment of infertility. This is undoubtedly very sound advice.

In a humorous speech at a meeting of the Western Counties Division (mentioned by Mr. G. N. Gould, jun., in his letter of May 1st), Mr. Smythe gave another warning. In common with others, he thought that extravagant claims were being made as to the virtues of sulphanilamide in the treatment of mastitis.

Yours faithfully,

Penzance. S. J. Motton.
May 9th, 1942.

. . . . .

To the Editor of the Veterinary Record

Sir,—There seems to be a good deal of *pro* and *anti* discussion on this subject in your correspondence columns. In order to obtain a fair and unbiased survey on the matter I would advise intending operators to read carefully Williams on "The Diseases of the Genital Organs of Animals" published in 1921 at Ithaca, N.Y., by the author. I am inclined to think that at least half a dozen copies of this work for the R.C.V.S. library would be no bad investment. There seems to be rather a plenitude of propaganda about the subject at present. It certainly is not meat for every practitioner's plate.

G. Mayall.

Bolton.

. . . . .

To the Editor of the Veterinary Record

Sir,—When contributors appear funny, they may actually be serious; when they appear serious, they may actually be funny. In any case, I make no apology for my unwonted lapse into the perpetration of a "witticism," for it has served its purpose and focused attention upon at least one of the dangers associated with the scheme.

In my own defence, in the face of Mr. Gould's "destructive criticism" that in spite of being a member of the Survey Committee I did not attend a meeting, may I state that there is nothing which I regret more, as I feel that my presence might have exerted a restraining influence, and for my absence I apologise to the profession. But no one knows better than Mr. Gould that the sole reason for my absence was a serious, if temporary, breakdown in health, for it was he who so kindly took my place on the Board of Examiners during my enforced absence. .

In reply to accusations that I have offered no constructive criticism, some time ago I contributed an article which I hoped might be considered to fulfil the conditions, but the war-time brevity of *The Veterinary Record* and the weight of more important contributions has, so far, prevented its publication.*

Some of us, who were studying the physiology of reproduction and attempting to treat sterility in the days when others of your contributors were still in the knickerbocker stage, are by no means convinced that our present knowledge regarding the factors which influence the oestrous cycle is yet complete, nor that the hormone therapy and methods of surgical interference in vogue to-day will persist in the light of future research. Perhaps it is because we have left behind our youthful enthusiasms and have become cynical through having lived long enough to realise our fallibility.

I am quite prepared to admit that the Survey Committee's proposals for the treatment of infertility, even if I do not wholly agree with them, constitute the most valuable part of its programme and I am quite in accord with any reasonable attempt to combat reproductive disorders. I am strongly in favour of experiment in the field and laboratory research, but—in the light of our present knowledge—I am *not* in favour of any scheme which tends to eliminate accurate diagnosis and rational treatment and substitutes for it a cut-and-dried remedy (?) for every type of disorder, apparently because the originators of the scheme fear that this is the only possible technique which the average general practitioner can be relied upon to carry out. Neither will I be a party to any scheme which proposes to stake the prestige of the profession upon the results of such treatment, especially when I realise that the dice are loaded against the practitioner from the commencement of the game.

Mr. Gould asks on what grounds the recommended treatment for infertility is condemned. I have evidence, which I propose to publish shortly, that in nearly *every* case in which expression of the corpus luteum is carried out, even at the most favourable period, some degree of haemorrhage occurs and it depends upon the coagulative index of the blood and possibly to some extent upon its Ca content as to whether the haemorrhage ceases before or after the appearance of clinical symptoms or whether the animal dies. Fortunately, in the great majority of cases, the animal survives, but the risk is always present and should never be incurred without very good reason. I have recorded cases of ovarian haemorrhage, one of which was fatal. I can also publish records of herds in which iodine irrigation has been carried out in a portion of each herd using the untreated animals as controls, and there has been little or no variation in the results obtained in the different groups. In other herds one group of animals has been treated by uterine irrigation and another by vaginal irrigation and again the results have been exactly similar. Finally, I am in a position to prove that uterine rupture can be brought about by the injection of amounts of fluid which the members of the Survey Committee would consider quite moderate.

What conclusive evidence has ever been brought forward to convince one that a blind faith in modern hormone therapy is justified, that stilboestrol induces ovulation or that an upsetting

* This article was received on March 16th and is down for insertion in order of receipt, as is our practice. Delay in publication of articles is much regretted, but heavy pressure on our space now precludes the possibility of inserting more than one main article, of average length, per issue.—*Editor.*

of the normal oestrous cycle by the expression of a normal structure from its normal position whilst fulfilling its normal function, can do anything but harm? Do we not tend to accept those things which we wish to accept with a degree of gullibility and an enthusiasm worthy of a band of empirics rather than of a body of scientific observers? At least, let us refrain from deceiving *ourselves*.

On the debit side also, there is the risk of widespread injury being caused by half-trained practitioners, previously totally unfamiliar with the class of work which they will suddenly be called upon to perform; for neither safety nor experience can be derived from a few lessons, however capable the instructor. The study of infertility cannot be completed in a few days and the man who knows little of the subject would be far more valuable to the community without a catheter.

Fortunately, for the practitioner, an insurance company may yet be found who will give him cover—for just so long as it remains solvent.

Yours faithfully,

Vean House, R. H. Smythe.
Camborne.
May 9th, 1942.

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THE COMPETENCE OF THE NEWLY-QUALIFIED

To the Editor of the Veterinary Record

Sir,—I suggest that a possible solution of the vexed problem of the lack of animal-mindedness on the part of students would be:—

1. A provision that a student must produce evidence of having served a specified number of vacations on a farm, or at an agricultural institute, before presenting himself for an examination—the one in question to be clearly defined.

2. That when the Revised Syllabus has been decided upon, the subject of Animal Husbandry shall be divided into three examinations, each one to be taken at specified periods in the curriculum.

Those students who are already spending their early vacations on farms are to be commended, for in addition to becoming versed in animal husbandry, they see animals in health.

Those about to do so need not be absolute "greenhorns" if they purchase a very useful book entitled "A Book of Farmcraft" by Michael Greenhill and Evelyn Dunbar and published by Longmans at five shillings.

Yours faithfully,

"Rothiemurchus," J. F. D. Tutt.
St. Cross,
Winchester.

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CONTROL OF ANIMAL DISEASE

To the Editor of the Veterinary Record

Sir,—May an interested reader, notwithstanding the lapse of time, comment briefly upon the voluminous correspondence on the above subject which appeared in the *Record* during 1941? There were many fine contributions, but according to my experience Mr. John Weir, of Strathaven, got nearest to the root of the matter. Mr. Weir concludes concerning the immense increase during the present century of certain diseases of dairy cows that "there must be some fundamental factors at work to produce it." Speaking from the only reliable standpoint, that of the observant scientific worker "who has watched these activities for a number of years," Mr. Weir has "formed the firm conviction that modern methods of dairy farming are more responsible for the present position" than are any germs.

Mr. Weir is right. I also have "watched these activities for a number of years" in many parts of the world and I would support Mr. Weir absolutely in all he says as to the first cause of the trouble being sociological rather than bacteriological. The veterinary profession has a unique chance here to show itself truly scientific by coming out strongly on this point. Moreover, it is the only way by which the profession can soundly protect itself from the contempt that must attend its inevitable failure to eradicate disease of dairy cows so long as the first cause of those diseases remains untouched.

Here, then, is the proper thing for the spokesmen of our profession to tell the people: "We will do what we can to mitigate by technical means the worst of what you are doing by a false philosophy and a bad social system. But we warn you beforehand that we shall not be able to do much, so long as you persist in using the cow as a means of making money rather than as a means of health."

In a former contribution I stated that the proper value of the veterinarian to the community would not be realised until he proved himself worthy to be heard in the highest council of the nation. If we all could bring ourselves to speak with one accord as Mr. Weir speaks, irrespective of self-interest, and with the mind fixed firmly on first causes, we soon should take our proper place. In the meantime we remain for the most part painstaking and ingenious artisans cobbling away in the rear of physiological disaster, which we know how to prevent but not by any socially acceptable means.

Yours faithfully,

Department of Agriculture, J. W. Rainey.
Devonport,
Tasmania.
February 20th, 1942.

* * * * *

"PREVENTIVE" OR "DEFENSIVE" MEDICINE?

To the Editor of the Veterinary Record

Sir,—Although "The History of Preventive Medicine" was not the main theme of the letter of mine you were good enough to publish on April 11th, I am interested in, and grateful for, Mr. Ernest Gray's historical comments upon it. I fear, however, that I must remain unrepentant as to the broad yet real accuracy of my statements, that Edward Jenner "discovered" vaccination, and that Mechnikoff, by what Mr. Gray calls "his immortal discovery of the function of the leucocytes," revealed the mechanism of all modern vaccination. The scratch on the hands of the dairy maid and its results were an "accident," but what was not accidental was that Jenner grasped the significance of what he saw, pursued it, perfected the methods of employing the benign pustule of variola, and so for the world and for all time made vaccination a beneficent reality. Millions of men must have witnessed the "accident" of an apple falling off a tree, but it needed the genius of a Newton to perceive in it the working of the law of gravitation. As a veterinary student I well remember the publication in 1887 of Mechnikoff's own story of the researches which led to his discovery of the functions of the leucocytes—he was then 42, and in that year began his collaboration with Pasteur in Paris. This, perhaps the most fascinating story in all the romance of research, thrilled, and almost startled the medical world; it shows clearly that his experiments as a biologist upon frogs, tadpoles, and other lowly creatures were first conducted by him as a young man in his native village of Ivanovka, and that his later brilliant completion of the same researches at Messina and Teneriffe is inseparable from this early background. I feel sure Mr. Gray will agree with me that it is a story which the modern student may well read and ponder with profit, for in it rests the sure foundation of our faith in the future triumphs of true Preventive Medicine, and that the story is "To be continued in our next."

Yours faithfully,

Prestatyn, E. P. Edwards.
N. Wales.
May 3rd, 1942.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV)

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
Mar. 16th to 31st, 1942	14	—	10	4	23
Corresponding period in—					
1941 ...	24	61	1	13	48
1940 ...	31	1	2	9	131
1939 ...	54	—	2	10	61
Total Jan. 1st to Mar. 31, 1942	81	11	23	91	110
Corresponding period in—					
1941 ...	136	176	6	92	554
1940 ...	160	15	10	91	920
1939 ...	262	29	19	139	338

Note.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at 31st March, 1942, was as follows:—

England	Wales	Scotland	Total (Great Britain)
3,891	9,083	3,352	16,326